

ACCESSION #: 9611260091  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: COMANCHE PEAK STEAM ELECTRIC STATION PAGE: 1 OF  
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UNIT 2

DOCKET NUMBER: 05000446

TITLE: REACTOR TRIP DUE TO LOSS OF REACTOR COOLANT PUMP CAUSED  
BY LOSS OF ELECTRICAL BUS 2A3

EVENT DATE: 10/18/96 LER #: 96-007-00 REPORT DATE: 11/18/96

OTHER FACILITIES INVOLVED: CPSES UNIT 1 DOCKET NO: 05000445

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: RAFAEL FLORES - SYSTEM ENGINEERING TELEPHONE: (817) 897-5590  
MANAGER

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

#### ABSTRACT:

On October 18, 1996, at approximately 03:06 a.m., an electrical fault on Comanche Peak Steam Electrical Station (CPSES) Unit 2 Service Air Compressor 2-01 motor initiated a lockout on non-safety 6.9 Kv bus 2A3. The loss of the 2A3 bus caused Reactor Coolant Pump 2-03 to de-energize, which resulted in a reactor trip due to Reactor Coolant System loop 3 low flow.

A probable cause for the loss of the 2A3 bus was believed to be slow opening of the service air compressor 2-01 motor breaker during an overcurrent condition, which did not trip in time to prevent lockout on the non-safety 6.9 Kv bus.

Troubleshooting and testing of the breakers did not indicate equipment failures. The affected equipment was tested and declared to be operational.

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## I. DESCRIPTION OF THE REPORTABLE EVENT

### A. REPORTABLE EVENT CLASSIFICATION

Any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System.

### B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

On October 18, 1996, just prior to the event, Comanche Peak Steam Electric Station (CPSES) Unit 2 was in Mode 1, Power Operation, with reactor power at 100 percent.

### C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT

There were no inoperable structures, systems or components that contributed to the event. Additionally, there was no work activity, testing or maintenance in progress which could have contributed to this event.

### D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

On October 18, 1996, Comanche Peak Steam Electric Station Unit 2 was at 100 percent power, Unit 1 was defueled and in its fifth refueling outage. At approximately 3:06 a.m. Reactor Coolant Pump 2-03 (EIS:(AB)(P)) tripped due to loss of non-safety bus 2A3, followed by a reactor trip due to loss of flow in reactor coolant loop 3. The plant operators (utility, licenced) stabilized Unit 2 in Mode 3, Hot Standby. There was no impact on Unit 1.

Following the reactor trip, it was discovered that a fault on the service air compressor motor caused a lockout on the non-safety 6.9 Kv bus 2A3. This lockout resulted in loss of Reactor Coolant Pump 2-03.

At approximately 3:53 a.m. on October 18, 1996 the NRC was notified of the event via the Emergency Notification System,

pursuant to the requirements of 10CFR50.72.

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E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE OR PROCEDURAL ERROR

The reactor trip was annunciated by numerous alarms in the Control Room. The immediate cause of the trip was reported by the AO.

II. COMPONENT OR SYSTEM FAILURES

A. FAILURE MODE, MECHANISM, AND EFFECT OF EACH FAILED COMPONENT

The service air compressor breaker failed to trip and isolate the service air compressor motor fault before the bus breaker tripped.

B. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

A fault in the service air compressor motor caused the bus 2A3 to trip leading to a trip of the Reactor Coolant Pump.

C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS

Not Applicable- No systems or secondary functions that were affected by failure of components with multiple functions.

D. FAILED COMPONENT INFORMATION

Manufacturer- Asea Brown Boveri  
Name- Air Circuit Breaker  
Model No.- 7.5 HK

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III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

The Reactor Protection System (EHS:(JC)) and Auxiliary

Feedwater System (EHS:(BA)) actuated during the event; all associated components within these systems functioned as designed.

## B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

No safety system trains were inoperable as a result of this event.

## C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

The reactor trip was the result of the loss of Reactor Coolant Pump 2-03. The reactor trip event is discussed in Section 15.3.1 of the CPSES Final Safety Analysis Report under "Partial Loss of Forced Reactor Coolant Flow." The analysis uses conservative assumptions to demonstrate that Departure from Nucleate Boiling Ratio (DNBR) will not decrease below the limiting value during the event. The event of October 18, 1996 occurred at 100 percent reactor power, and all protective functions responded as designed. The October 18, 1996 event is bounded by the FSAR accident analysis which makes conservative assumptions which reduce the capability of safety systems to mitigate the consequences of the transient. Based on the aforementioned the subject event did not adversely affect the safe operation of CPSES Unit 2 or the health and safety of the public.

## IV. CAUSE OF THE EVENT

Based on information gathered, the sequence of events for the October 18, 1996 event are as follows:

- o The shield on the neutral ground resistor cable of the auxiliary transformer is already shorted, or shorts, to ground causing a loss of protective relay coordination
- o A fault occurs at the service air compressor motor

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- o Service air breaker relays fail to trip the breaker
- o Bus 2A3 trips due to the fault on the service air compressor motor
- o Reactor trip due to loss of reactor coolant system loop 3 low

flow condition

- o Service air breaker trips on overcurrent

- o Undervoltage relays on the 6.9 Kv bus trips all the loads on the bus, including the Reactor Coolant Pump 2-03 (EHS:(AB)(P))

Troubleshooting indicated that the most probable cause for the event was that during the overcurrent condition, the service air breaker failed to trip. This event was most probably caused by loss of protective relay coordination due to the short around the Unit 2 auxiliary transformer (2UT) neutral grounding resistor. Other potential causes include the service air compressor breaker opening slow, or the lockout relay failing to initiate a trip. No equipment failures were found when testing the breaker and the lockout relays, however, failure to operate would not necessarily have been a repeatable problem.

## V. CORRECTIVE ACTIONS

The overcurrent relays that actuated (targets dropped) were tested. Meter & relay technicians (utility, non-licensed) tested all relays and they tested satisfactorily,

The service air compressor breaker was tested in accordance with the site maintenance procedures. All other inspections and tests were satisfactory. The breaker tested satisfactory, including timing tests.

The service air compressor motor was meggered. Phase A was found to be open circuited while B and C phase were satisfactory.

Based on the test results and troubleshooting performed, TU Electric Engineering determined that there is adequate assurance that Bus 2A3 and

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transformer 2UT were operational and they were returned to service to support full power operation of Unit 2.

## VI. PREVIOUS SIMILAR EVENTS

There have been no previous reactor trips attributed to the causes identified during this event investigation.

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File # 10200

TUELECTRIC Ref. # 10CFR50.73(a)(2)(iv)

C. Lance Terry November 18, 1996  
Group Vice President

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)-UNIT 2  
DOCKET NO. 50-446  
ACTUATION OF REACTOR PROTECTION SYSTEM  
LICENSEE EVENT REPORT 446/96-007-00

Enclosed is Licensee Event Report (LER) 96-007-00 for Comanche Peak Steam  
Electric Station Unit 2 "Reactor Trip Due to Loss of Reactor Coolant Pump  
Caused by Loss of Electrical Bus 2A3."

Sincerely,

C. L. Terry

OB:ob  
Enclosure

cc: Mr. L. J. Callan, Region IV  
Mr. J. I. Tapia, Region IV  
Resident Inspectors, CPSES

P. O. Box 1002 Glen Rose, Texas 76043

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